Measuring Economic Policy Uncertainty

Steven J. Davis, Chicago & NBER

Research with Scott Baker (joining Kellogg) And Nick Bloom (Stanford & NBER)

UC-San Diego
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Economic Uncertainty: Multi-faceted and hard to measure
Economic Uncertainty: Multi-faceted and hard to measure

But important in many theories & mechanisms:

-- Option value of waiting
-- Precautionary savings
-- Cost of finance → investment
-- Ambiguity aversion
-- Managerial risk aversion
Today’s Focus: Newspaper-based measures of Economic Policy Uncertainty
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Consider other EPU measures too, partly as a cross-check on newspaper-based measures.
Research Objectives

1. Construct new measures of Economic Policy Uncertainty (EPU). Thus far:
   - Monthly indexes for USA, Canada, UK, Germany, France, Italy, Spain, China, India and Japan.
   - Daily measure for USA

2. Develop methods to evaluate and refine the newspaper-based indexes.

3. Assess the view that policy-related economic uncertainty is at historically high levels in recent years in the U.S. and in Europe.
   - Which events and policy matters account for large changes in policy-related economic uncertainty?
Research Objectives

4. Assess the effects of policy uncertainty on firm-level and macroeconomic performance
   – As an impulse or driving force
   – In amplifying and propagating other shocks (e.g., the financial crisis)

5. Related work: Understand economic, political and social forces behind policy uncertainty

6. Underway: Surveys of subjective business expectations & perceived uncertainty – Bloom & Davis w/ Atlanta Fed researchers & others
What Do We Want our EPU Index to Capture?

All of the following:

• Uncertainty about who will make economic policy decisions – e.g., who will win the next elections?
• Uncertainty about what economic policy actions decision makers will undertake, and when.
• Uncertainty about the economic effects of policy actions – past, present and future actions
• Economic uncertainty induced by policy inaction
• Economic uncertainty related to national security concerns and other policy matters that are not mainly economic in character
Constructing Our Newspaper-Based EPU Index for the U.S.

• Search digital archives of 10 major newspapers for articles with terms related to EPU

• For each newspaper:
  – Get monthly EPU article counts
  – Scale by count of all articles in same month
  – Normalize scaled count so that SD=1 for 1985-2010

→ Newspaper-level EPU Index

• Sum across newspaper-level indexes by month to get the U.S. EPU index
Constructing Our Newspaper-Based EPU Index for the U.S.

Text String Search Criteria:

EU: {economic OR economy} AND
{uncertain OR uncertainty}

EPU: ... AND {regulation OR deficit OR “federal reserve” OR congress OR legislation OR “white house”}
Constructing Our Newspaper-Based EPU Index for the U.S.

Text String Search Criteria:
EU: \{economic OR economy\} AND \{uncertain OR uncertainty\}
EPU: ... AND \{regulation OR deficit OR “federal reserve” OR congress OR legislation OR “white house”\}

Later: How do we select the “policy” terms for our EPU search filter?
Constructing Our Newspaper-Based EPU Index for the U.S.

Newspapers:
• Boston Globe
• Chicago Tribune
• Dallas Morning News
• Los Angeles Times
• Miami Herald
• New York Times
• SF Chronicle
• USA Today
• Wall Street Journal
• Washington Post

Note: We use Access World News Newsbank Service when constructing a daily EPU Index, because the daily index requires a higher density of news sources.
US Newspaper-Based Economic Policy Uncertainty (EPU) Index

January 1985 to February 2014

European Newspaper-Based EPU Index

January 1997 to February 2014

Two Measurement Concerns

**Suitability:** Whether an accurate count for news articles about a particular type of uncertainty provides a good indicator for that type of uncertainty.

**Accuracy:** Whether specific text-string search criteria accurately identify the set of articles that discuss a certain type of uncertainty, e.g., policy-related economic uncertainty.
Assessing Suitability Concern

_Idea:_ Apply news-based approach to a concept of uncertainty for which we have external, market-based evidence.

_Implementation:_ Compare VIX measure of uncertainty about future equity returns to a news-based index of equity market uncertainty, with search terms as follows:

{economic OR economy} AND
{uncertain OR uncertainty} AND
{“stock price” OR “equity price” OR “stock market”}
Figure 7: Newspaper-based index of equity market uncertainty compared to market-based VIX, January 1990 to December 2012

Correlation=0.733

Notes: The news-based index of equity market uncertainty is based on the count of articles that reference ‘economy’ or ‘economic’, and ‘uncertain’ or ‘uncertainty’ and one of ‘stock price’, ‘equity price’, or ‘stock market’ in 10 major U.S. newspapers, scaled by the number of articles in each month and paper. The news-based index and the VIX are normalized to a mean of 100 over the period.
Political Slant in Newspaper Coverage of Economic Policy Uncertainty
Figure 9: Political slant plays little role in time-series behavior of news-based EPU index

Source: Papers sorted into 5 most ‘Republican’ and 5 most ‘Democratic’ groups using the media slant measure from Gentzkow and Shapiro (2010).
Assessing Accuracy Concern

Working under our direction, RA teams read several thousand newspaper articles, following a 50-page audit guide to code articles: EU=0/1, EPU=0/1, and much more …
Using the Audit Sample and our preferred policy term set, correlation is 0.84 between human and computer methods.

**Note**: Based on random samples of 45 articles per quarter (fewer prior to 1993). For these articles, we calculate quarterly EPU rates based on human readings (red line) and based on computer-automated methods (blue line).
Other Audit Results

• Correlation of news-based EPU error rate and real GDP growth rate = -0.12 (raw quarterly data)
• Correlation of EPU error rate and “true” EPU:
  = -0.11 in the raw quarterly data
  = -0.06 in detrended quarterly data
• Among EPU=1 articles:
  – 5% are mainly about low or declining uncertainty
  – 73% discuss uncertainty about what or when
  – 32% discuss uncertainty about effects
  – 15% discuss uncertainty about who
## Other Audit Results

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<th>Uncertainty about <strong>Who</strong></th>
<th><strong>Who</strong> Uncertainty Times EPU Value</th>
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<tr>
<td>All Years</td>
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<tr>
<td>Presidential Election Years</td>
<td>37% of EPU Articles</td>
<td>42</td>
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<th><strong>Effects</strong> Uncertainty Times EPU Value</th>
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<tr>
<td>Presidential Election Years</td>
<td>70</td>
<td>28</td>
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Selecting a Preferred Term Set


• + 14,000 combinations that replace terms like “policy” and “government” with multi-word terms like “government policy”

• Interpreting the human coding as truth, select the term set that minimizes the sum of false positive and false negative error rates
Error rates for 28,000 permutations of 14 policy terms in a human audit sample of 3,500 randomly selected articles

Permutations of 14 policy terms: regulation, budget, deficit, tax, federal reserve, government, congress, senate, president, legislation, government spending, federal spending, etc.

Our preferred policy term set: {congress, deficit, “federal reserve”, legislation, regulation, “white house”}

False positives and false negatives expressed as a fraction of true EPU – as judged by human readers.
More Sophisticated Methods?

• Our EPU measure is simple and transparent:
  – Based on presence of certain terms, classify each newspaper article as EPU = 1 or 0.
  – Automate and search over vast digital archives.
  – Count the 1’s, scale, and aggregate over papers.

• Can we build a better EPU index using more sophisticated classification methods in machine-learning literature? We are investigating.

• Practical constraints:
  – Archives don’t reside on our disk
  – Search platforms have limited capabilities
Three Other Types of Indicators of Economic Policy Uncertainty for the United States

• Tax Code Expirations Index
  – Discounted revenue impacts of federal tax code provisions set to expire over next 10 years
  – Based on Congressional Budget Office projections

• Frequency counts for “uncertainty” and policy-related uncertainty in the Federal Reserve’s Beige Books:
  – Beige Book issued every six weeks in advance of each regularly scheduled FOMC meeting since 1983

• Survey-based measures of disagreement among professional forecasters about future inflation and future government purchases of goods and services.
  – See paper or back of slide deck.
Figure 3: Federal Tax Code Expirations Index, 1991-2013

Notes: Based on Congressional Budget Office data on projected revenue effects of federal tax code provisions set to expire in the current calendar year and next ten years. For a given year, the index value is calculated as the discounted sum of projected revenue effects associated with expiring tax code provisions, using a discount factor of $0.5^T$ applied to future revenue effects for $T=0,1,...,10$ years. Index normalized to a mean of 100 before 2010.
Figure 3: Federal Tax Code Expirations Index, 1991-2013

Undiscounted projected 10-year revenue impact of scheduled tax code expirations:
• Before 2003 < $250 billion
• 2009-2012: $3-5 trillion

2013: Huge drop due to “Fiscal Cliff” resolution

Notes: Based on Congressional Budget Office data on projected revenue effects of federal tax code provisions set to expire in the current calendar year and next ten years. For a given year, the index value is calculated as the discounted sum of projected revenue effects associated with expiring tax code provisions, using a discount factor of $0.5^T$ applied to future revenue effects for $T=0,1,...,10$ years. Index normalized to a mean of 100 before 2010.
Counts of “Uncertainty” and Policy-Related Uncertainty per Beige Book, 1983Q3-2013Q4

Evidence about Sources of Policy Uncertainty
What drives recent rise in U.S. economic policy uncertainty?

<table>
<thead>
<tr>
<th>SHARE OF POLICY UNCERTAINTY ARTICLES BY TOPIC, %</th>
<th>1985-2007</th>
<th>2008-2012</th>
<th>Change</th>
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Note: Analysis uses Newsbank coverage of around 1000 US national and local newspapers
See Table 1 in the Baker, Bloom and Davis (2013) for a more detailed analysis.
What drives recent rise in U.S. economic policy uncertainty? Newspaper articles point mainly to concerns about fiscal and healthcare policies.

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## Counts By Category and Selected Time Period, 1983Q3 to 2013Q1

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... But also Highlight Concerns Related to Financial Regulation, Sovereign Debt, and Politics

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- Overall Economic Uncertainty
- Economic Policy Uncertainty
- All Fiscal Matters
- Taxes Only
- Spending Only
- Monetary Policy
- Health Care
- National Security and War
- Financial Regulation
- Sovereign debt, currency crisis
- U.S. Elections and Leadership Changes
- Other Specified Policy Matters
- Politics, Unspecified
- Sum of Policy & Politics Categories
And NEVER Breathe a Word about about Monetary Policy Uncertainty!

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<td>Politics, Unspecified</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0.7</td>
<td>0</td>
<td>1.6</td>
<td>0.3</td>
</tr>
<tr>
<td>Sum of Policy &amp; Politics Categories</td>
<td>6.8</td>
<td>9.3</td>
<td>2.2</td>
<td>5.2</td>
<td>3.0</td>
<td>0.8</td>
<td>10.0</td>
<td>2.5</td>
</tr>
</tbody>
</table>
Big 5 Sources of Economic Policy Uncertainty, 1985Q1 to 2013Q3

Note: This chart is a quarterly version of Table 1 in “Measuring Economic Policy Uncertainty” by Baker, Bloom and Davis. It shows the 5 most important sources of economic policy uncertainty based on frequency counts of newspaper articles.
U.S. Economic Policy Uncertainty: A Longer Term Perspective
Newspaper-Based EPU Index from 1900 – Scaled by “Economy/ic” articles rather than all articles

January 1900 – December 2012

Notes: Index of Policy-Related Economic Uncertainty composed of quarterly news articles containing uncertain or uncertainty, economic or economy, and policy relevant terms (scaled by the smoothed total number of articles) in 5 newspapers (WP, BG, LAT, WSJ and CHT). Data normalized to 100 from 1900-2011.
Large daily stock market moves, 1900-2012

Correlation of number of policy-triggered jumps per year with EPU index is 0.78

Based on human readings of next-day news articles About large S&P Index moves in the New York Times And the Wall Street Journal. Jump threshold: +/- 2.5%

Reproduced from “What Triggers Large Stock Market Jumps?” by Baker, Bloom & Davis
Assessing the Effects of EPU: Summary of our Work

1. **Micro approach**: Exploit differences in exposure to government spending to estimate the effects of EPU on firm-level implied volatility, investment rates and employment growth.

1. **Macro approach**: Include our EPU measure in otherwise standard VAR models of aggregate dynamics. Estimate the effects of EPU innovations on aggregate output, investment and employment.
Microdata: Our firm-level panel regressions exploit differences in industry exposure to government spending.

Table 4: Highest Contract Intensities by SIC Code

<table>
<thead>
<tr>
<th>SIC Code</th>
<th>SIC Description</th>
<th>Total Contracts (BS$)</th>
<th>Total Revenue (BS$)</th>
<th>Contract Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3760</td>
<td>Guided Missiles And Space Vehicles And Parts</td>
<td>392.63</td>
<td>511.65</td>
<td>0.767</td>
</tr>
<tr>
<td>3790</td>
<td>Miscellaneous Transportation Equipment</td>
<td>184.72</td>
<td>388.13</td>
<td>0.476</td>
</tr>
<tr>
<td>3812</td>
<td>Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems</td>
<td>315.28</td>
<td>694.00</td>
<td>0.454</td>
</tr>
<tr>
<td>3480</td>
<td>Ordnance And Accessories, Except Vehicles And Guided Missiles</td>
<td>22.15</td>
<td>54.64</td>
<td>0.405</td>
</tr>
<tr>
<td>2780</td>
<td>Blankbooks, Looseleaf Binders, And Bookbinding</td>
<td>18.19</td>
<td>46.91</td>
<td>0.388</td>
</tr>
<tr>
<td>8711</td>
<td>Engineering Services</td>
<td>86.76</td>
<td>369.00</td>
<td>0.235</td>
</tr>
<tr>
<td>1623</td>
<td>Water, Sewer, Pipeline, and Communications and Power Line Construction</td>
<td>26.64</td>
<td>135.44</td>
<td>0.197</td>
</tr>
<tr>
<td>1600</td>
<td>Heavy Construction Other Than Building Construction Contractors</td>
<td>87.71</td>
<td>543.66</td>
<td>0.161</td>
</tr>
<tr>
<td>3720</td>
<td>Aircraft And Parts</td>
<td>83.49</td>
<td>584.59</td>
<td>0.143</td>
</tr>
<tr>
<td>8050</td>
<td>Nursing And Personal Care Facilities</td>
<td>1.44</td>
<td>15.32</td>
<td>0.094</td>
</tr>
<tr>
<td>7373</td>
<td>Computer Integrated Systems Design</td>
<td>162.05</td>
<td>1,181.42</td>
<td>0.089</td>
</tr>
<tr>
<td>3714</td>
<td>Motor Vehicle Parts and Accessories</td>
<td>161.90</td>
<td>2,213.25</td>
<td>0.076</td>
</tr>
<tr>
<td>3844</td>
<td>X-Ray Apparatus and Tubes and Related Irradiation Apparatus</td>
<td>1.77</td>
<td>24.22</td>
<td>0.073</td>
</tr>
</tbody>
</table>

Notes: Contract Intensity refers to the average ratio of federal contracts given to a firm relative to total revenue across all firms in an 4 digit SIC code. Only industries with BS1 or above of contracts are shown.

Source: Authors’ calculations using the Federal Registry of Contracts (1999-2013) matched to Compustat firms (using Compustat parent & D&B names).
Note: We assign an intensity value of 0.43 to Health Services based on government spending share in this sector.
**Microdata Results:** Firms in sectors with greater exposure to government spending have higher stock volatility when EPU is high.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(EPU)(_t\times)Intensity</td>
<td>0.414*** (0.118)</td>
<td>0.349** (0.173)</td>
<td>0.331** (0.0901)</td>
<td>0.624*** (0.183)</td>
<td></td>
<td></td>
<td>1.171*** (0.344)</td>
</tr>
<tr>
<td>Log(EPU)(_{t+1}\times)Intensity</td>
<td>(Next quarter EPU(*)Intensity)</td>
<td>0.099 (0.097)</td>
<td>-0.012 (0.097)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log(EPU)(_{t-1}\times)Intensity</td>
<td>(Last quarter EPU(*)Intensity)</td>
<td>-0.192 (0.136)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log(VIX)(_t\times)Intensity</td>
<td>(Current EPU(*)Intensity)</td>
<td>-25.09*** (9.746)</td>
<td>-14.60 (14.72)</td>
<td>-25.35** (10.228)</td>
<td>-29.49*** (10.13)</td>
<td></td>
<td>-8.13 (9.512)</td>
</tr>
<tr>
<td>Federal Expenditure/GDP(*)Intensity</td>
<td>(Federal Expenditure/GDP(*)Intensity)</td>
<td>-25.09*** (9.746)</td>
<td>-14.60 (14.72)</td>
<td>-25.35** (10.228)</td>
<td>-29.49*** (10.13)</td>
<td></td>
<td>-8.13 (9.512)</td>
</tr>
<tr>
<td>Log(EPU)(_t\times)Durability</td>
<td>(Log(EPU)(_t\times)Durability)</td>
<td>0.0264*** (0.0079)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log(VIX)(_t\times)Input-Output Intensity</td>
<td>(Log(VIX)(_t\times)Input-Output Intensity)</td>
<td>0.266*** (0.0837)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log(EPU) (_t\times)Intens, F-test</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Fed Exp/GDP (_t\times)Intens, F-test</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm and Time Fixed-Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>116,488</td>
<td>296,768</td>
<td>112,593</td>
<td>116,278</td>
<td>51,906</td>
<td>116,263</td>
<td>116,278</td>
</tr>
<tr>
<td>Number of Firms</td>
<td>5,191</td>
<td>10,759</td>
<td>5,046</td>
<td>5,046</td>
<td>2,103</td>
<td>5,002</td>
<td>5,191</td>
</tr>
</tbody>
</table>

**Notes:** Data is for 1996-2012. All columns include a full set of firm and year fixed effects. **Implied Vol.** is the average 91-day ahead implied volatility for the firm the current quarter (average over each day in the quarter). **Realized Volatility** is the standard-deviation of daily stock returns for the firm in the quarter. Log(EPU)\(_t\times\)Intensity is the log of the policy uncertainty index in the current quarter scaled by the government intensity measure (measured using individual firm’s SIC-4 digit accounting segments data to allocate firms to Government contract intensity data by SIC 4-digit industry). Federal Expenditure/GDP\(_t\times\)Intensity is the level of actual Federal Expenditure over GDP from NIPA tables, while Forecast (1-year) Federal Expenditure/GDP\(_t\times\)Intensity uses the mean forecast level of federal expenditure/GDP for the next quarter. In column (6) the instrumental variables are the outbreak of war (Gulf-war 1, 1990 Q3 - 1991 Q1; 9/11 and Afghanistan Standard 2001 Q3 – 2002 Q1; Gulf War II 2002 Q4 – 2003 Q2) or a presidential election (1996, 2000, 2004, 2008 and 2012 Q4). Errors clustered at the firm level.
Magnitude of Implied Volatility Effects

Summary Statistics

• Mean firm-level implied volatility = 0.5
• Time-Series st. dev. of firm-level implied vol.:
  -- 0.14 for low-exposure firms
  -- 0.13 for high-exposure firms

Illustrative Calculation

• Consider a 100 log-point increase in EPU for a firm with an exposure level of 0.25.
• Use IV results to get implied impact on firm’s implied volatility: \((0.25)(1.0)(1.17)=0.29\)
  -- About 60% of mean firm-level volatility
  -- More than twice the average time-series st. dev.
Using annual firm-level data from 2000.

Microdata Results: High EPU depresses investment and employment growth at firms in sectors with high exposure to government spending.

Table 5: Cross-Firm Effects of Policy Uncertainty

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>(1) Investment (I_t/K_t)</th>
<th>(2) Investment (I_t/K_t)</th>
<th>(3) Investment (I_t/K_t)</th>
<th>(4) Investment (I_t/K_t)</th>
<th>(5) Investment (I_t/K_t)</th>
<th>(6) ΔLog(Emp)</th>
<th>(7) ΔLog(Emp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLog(EPU)×SIC Intensity</td>
<td>-0.0578***</td>
<td>-0.064***</td>
<td>-0.065***</td>
<td>-0.056***</td>
<td>-0.009</td>
<td>-0.019**</td>
<td></td>
</tr>
<tr>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.012)</td>
<td>(0.008)</td>
<td>(0.009)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔForecast Fed Exp/GDP×SIC Intensity</td>
<td>2.103***</td>
<td>2.004***</td>
<td>2.394***</td>
<td>2.989***</td>
<td>1.208***</td>
<td>0.441</td>
<td></td>
</tr>
<tr>
<td>(0.607)</td>
<td>(0.678)</td>
<td>(0.633)</td>
<td>(0.612)</td>
<td>(0.362)</td>
<td>(0.423)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔFederal Exp/GDP×SIC Intensity</td>
<td>2.269</td>
<td>1.961</td>
<td>1.507</td>
<td>3.886***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3.639)</td>
<td>(3.270)</td>
<td>(3.344)</td>
<td>(3.886)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔVIX×SIC Intensity</td>
<td>-0.034***</td>
<td>-0.011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.004)</td>
<td>(0.007)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Periodicity

<table>
<thead>
<tr>
<th></th>
<th>Quarterly</th>
<th>Quarterly</th>
<th>Quarterly</th>
<th>Quarterly</th>
<th>Yearly</th>
<th>Yearly</th>
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</thead>
<tbody>
<tr>
<td>Firm and Time Fixed-Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>717,104</td>
<td>717,104</td>
<td>717,104</td>
<td>717,104</td>
<td>184,804</td>
<td>184,804</td>
</tr>
<tr>
<td>Number of Firms</td>
<td>22,638</td>
<td>22,638</td>
<td>22,638</td>
<td>22,638</td>
<td>21,667</td>
<td>21,667</td>
</tr>
<tr>
<td>Number of SIC codes</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
<td>440</td>
</tr>
</tbody>
</table>

Notes: All columns include a full set of firm and time fixed effects (year by quarter in columns 1 to 5, and yearly in columns 6 and 7). For columns 1-5, independent variables are lagged by one quarter. Standard errors clustered at the 4-digit SIC code level.
Magnitude of Firm-Level Investment Effects

- For a firm with average investment rate and average contract exposure, doubling EPU results in estimated investment fall of only 0.08 percentage points (~1.2% fall).
- For firms in the 90th percentile of exposure rates, the impact is much larger, with predicted investment drops of 0.8-5.0 percentage points, depending on specification and baseline investment.
Figure 12: Estimated Industrial Production and Employment after a Policy Uncertainty Shock

Notes: This shows the impulse response function for Industrial Production and employment to an 102 unit increase in the policy-related uncertainty index, the increase from 2006 (the year before the current crisis) to 2011. The central (black) solid line is the mean estimate while the dashed (red) outer lines are the one-standard-error bands. Estimated using a monthly Cholesky Vector Auto Regression (VAR) on the EPU index, log(S&P 500 index), federal reserve funds rate, log employment, log industrial production and linear time trend. Fit to data from 1985 to 2011.
Figure 13: Robustness of Estimates to Different VAR Specifications

Notes: This shows the impulse response function for GDP and employment to an 102 unit increase in the policy-related uncertainty index. Estimated using a monthly Cholesky Vector Auto Regression (VAR) of the uncertainty index, log(S&P 500 index), federal reserve funds rate, log employment, log industrial production and time trend unless otherwise specified. Data from 1985 to 2011.
Assessing the Effects of EPU: Selected Other Work

1. **Geography of Great Recession:** Shoag and Veuger (2013) find larger unemployment rate rises from 2006 to 2009 in states with (a) greater increases in state-level uncertainty and (b) institutions less well suited for mediating the effects of a general rise in uncertainty.

2. **International Spillovers:** The IMF’s World Economic Outlook (2013) finds that increases in U.S. and European EPU reduce growth in other regions of the world, with bigger spillover effects from U.S. EPU.

Summary

• **Methodology:** New methods to construct, evaluate and refine measures of economic uncertainty based on frequency counts of newspaper articles and other text sources.

• **Factual Claim:** U.S. EPU levels are at historically high levels from 2008-2013.
  • Major episode in the 1930s as well.

• **Data Products:** New monthly indices of EPU for U.S., China, Germany, Japan, Spain, France, Italy, U.K., India, and Canada. A new daily EPU index for the United States
Summary

• **Evidence of EPU Effects:**
  • Firm-level regressions: high levels of EPU reduce investment and employment growth at firms with high exposure to government contract awards, and raise stock volatility.
  • Simple VAR models: increases in EPU foreshadow declines in output, investment, and employment.

• **Correlates of Rising EPU:** Secular growth in U.S. EPU coincide with growth of government and increasing political polarization.
  • Our paper with Canes-Wrone & Rodden
More on Economic Policy Uncertainty at www.policyuncertainty.com
End of Slides for Prepared Remarks
References

• International Monetary Fund, 2013. World Economic Outlook: Hopes, Realities, Risks, April.
What Drives the Secular Rise in EPU Since 1960?

Two Broad Classes of Explanations:

1) Expanding Scale and Scope of Government
2) Increasing Political Polarization

These two types of explanations are not mutually exclusive, and they could overlap. Other explanations are also possible.
US Newspaper-based policy uncertainty index shows a strong upwards trend since the 1960s.

One source of rising policy uncertainty could be the expansion of Government spending.

Notes: Total government spending as a % of GDP from the US BEA (federal, state, and local spending on consumption, investment and transfer payments). See [http://www.bea.gov/faq/index.cfm?faq_id=552](http://www.bea.gov/faq/index.cfm?faq_id=552)
Another source of rising policy uncertainty could be the increasing volume of Government regulation.

Another source of rising policy uncertainty could be the increasing volume of Government regulation.

The size and complexity of the federal tax code has also increased enormously in recent decades.

Figure A.1: Sectoral Shares of GDP and of All EU Articles by Decade, 1940-2010

Agriculture

Manufacturing

FIRE

Dashed Blue Line: Sector’s Share of EU Articles
Solid Red Line: Sector’s Share of GDP
Republican-Democrat differences in Congressional voting patterns point to rising political polarization

Notes: DW-Nominate index is the difference between the mean Republican and mean Democratic DW-Nominate roll-call ideal points generated by McCarty, Poole, and Rosenthal. Bonica (2013) has created ideological scores for each member of Congress based on scaling of campaign contribution records. We display the difference between the means of Republicans and Democrats in Congress.
The electorate also appears to perceive the two parties as increasingly polarized.

Notes: DW-Nominate index is the standard-deviation of the first dimension of the DW-Nominate roll-call idealized points. The percentage seeing large difference between Democrats and Republicans in the American National Electoral Survey.
In contrast, U.S. voter preferences are unimodal and show little evidence of polarization.

Notes: This scale was created by Ansolabehere, Rodden, and Snyder (2006) from responses to a variety of questions on economic policy issues appearing in each General Social Survey from 1974 to 2004.
Economic Uncertainty Measures & Proxies

1) Implied volatility of equity returns (e.g., VIX) ☺
2) Newspaper-based measures (e.g., our EPU index) ☻
3) Forecaster disagreement & uncertainty (e.g., Philly Fed) ☹
4) Qualitative surveys (e.g., our Beige Book count) ☹
5) Output volatility (e.g., GDP GARCH)
6) Dispersion and volatility of business-level outcomes

😊 = Available in real-time
☻ = Available with a delay of several weeks or so
Forecaster Disagreement about Future Inflation and Future Government Purchases
Figure 4: Interquartile Range of Four-Quarter-Ahead CPI Inflation Forecasts, Percentage-Point Spread, Q1 1985 to Q4 2012

Notes: From the Federal Reserve Bank of Philadelphia Survey of Professional Forecasters (made every quarter; offset one month due to release dates such that Q4 covers Nov-Jan. Displays the Interquartile (IQ) range of the quarterly 1-year-ahead forecasts of CPI.
Figure 5: Interquartile Range of Government Purchases Forecasts, Q1 1985 – Q2 2013

Notes: Based on data from the Federal Reserve Bank of Philadelphia Survey of Professional Forecasters. We compute the interquartile range (IQR) of 1-year ahead forecasts of government purchases of goods and services and scale the IQR by the median forecast. We carry out these calculations separately for federal purchases and state & local purchases, then aggregate using the purchases share of nominal GDP for each level of government. See the main text for additional details.
Economic Policy Uncertainty Indexes for Other Countries
China EPU Index, Jan 1995-Jun 2013, Based on South China Morning Post

- Oct 2001, post 9/11 recession, HK policy response
- Sep 2002, Iraq war threat, deflation in HK
- Sep 2008, inflation pressures, slowing exports
- Nov 2011, Eurozone fears and trade protectionism
- China slowdown, political transition
- Feb 1995, trade war concerns and Deng’s health
- May 1995, financial deregulation and SOE reform
- Nov 2000, US election, China’s WTO entry
- Mar 2003, Iraq war, China’s deflation and deficit
- Mar 2008, inflation versus recession tradeoff
- Apr 2006, China stimulus and redistribution measures
- Feb 1998, Asian financial crisis
India Policy Uncertainty Index

January 2003 to June 2013

Using a 50% weight on six major Indian newspapers and a 50% weight on forecaster disagreement measures. Constructed in collaboration with Sanjai Bhagat, Pulak Ghosh and Srivivasan Rangan. Downloaded from www.PolicyUncertainty.com on 7 July 2013
UK Economic Policy Uncertainty Index

Germany Economic Policy Uncertainty Index

Spain Economic Policy Uncertainty Index

Canadian Economic Policy Uncertainty Index

Canadian Economic Policy Uncertainty Index

Canadian Election and Lehman Bros. Debt Ceiling Dispute; Euro Debt

Canadian Election

Canadian Election

1st Gulf War

Clinton Election

Quebec Referendum

Canadian Elections

9/11

2nd Gulf War

Source: www.policyuncertainty.com. Created with help from Dorinda So from the Institute for Competitiveness & Prosperity www.competeprospor.ca
More on the Audit and
Another Suitability Check
Running the Newspaper Article Audit
1. Design, evaluate, and refine audit template
2. Define the Audit Universe: All articles coded EU=1 by automated search
3. Sample Audit Universe and manually read articles
   – Randomly sample 3 articles per month for 5 of the newspapers; 45 articles per quarter
4. Code each article: EU, EPU, type of EPU, etc.
5. Compare manually read ‘truth’ to results from automated search with various permutations of policy terms
Suitability check: news based indices for tracking unemployment also seem to work well

Notes: Index of Unemployment News composed of quarterly news articles containing terms like ‘unemployment’, ‘layoffs’, or ‘job loss’ (scaled by the smoothed total number of articles) in 5 newspapers (WP, BG, LAT, WSJ and CHT). Data normalized to 100 from Jan 1900-Dec 2011. Unemployment data is overall seasonally adjusted unemployment rate taken from the BLS.
More Checks and Comparisons
“Debt Ceiling” and “Government Shutdown” in U.S. Newspapers, Jan. 1985 to Nov. 2013

This chart reports frequency counts of articles containing “debt ceiling” or “government shutdown”, expressed as a fraction of all articles in U.S. newspapers covered by Access World News Newsbank Service (1000+ newspapers).

Note: Data for November 2013 are based on part of the month.
Somewhat Different Experiences in Great Depression and Great Recession

Notes: Index of Policy-Related Economic Uncertainty composed of quarterly news articles containing uncertain or uncertainty, economic or economy, and policy relevant terms (scaled by the smoothed total number of articles) in 5 newspapers (WP, BG, LAT, WSJ and CHT). Data normalized to 100 from 1900-2011.
Comparison Newsbank (daily data summed to the monthly level) with our 10 paper series
Different weighting schemes for index components give similar results

- Baseline (main) Economic Policy Uncertainty Index
- Equal-Weighted Index (1/4 each on z-scores)
- Principal Component Factor Index
Circulation weighting in news-based index component matters little

**Notes:** Index of Policy-Related Economic Uncertainty composed of quarterly news articles containing uncertain or uncertainty, economic or economy, and policy relevant terms (scaled by the smoothed total number of articles) in 5 newspapers (WP, BG, LAT, WSJ and CHT). Data normalized to 100 from Jan 1900-Dec 2011. Government expenditure is total federal, state, and local expenditures over GDP, annually.
US index is similar to the VIX index of 1 month implied S&P500 stock market volatility, but not the same

Correlation VIX and Policy Uncertainty is 0.55

EPU Index Is More similar to 10 year index of implied volatility on the S&P500 (correlation 0.73)

Notes: Data from “The buzz: Links between policy uncertainty and equity volatility”, by Krag Gregory and Jose Rangel, Goldman Sachs, November 12, 2012.
Key variable of interest is the interaction between aggregate EPU change and firm-level exposure to government contract awards.

Table 5: Cross-Firm Effects of Policy Uncertainty

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>(1) Investment ($I_t/K_{t-1}$)</th>
<th>(2) Investment ($I_t/K_{t-1}$)</th>
<th>(3) Investment ($I_t/K_{t-1}$)</th>
<th>(4) Investment ($I_t/K_{t-1}$)</th>
<th>(5) Investment ($I_t/K_{t-1}$)</th>
<th>(6) ΔLog(Emp)</th>
<th>(7) ΔLog(Emp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLog(EPU)×SIC Intensity</td>
<td>-0.0578*** (0.008)</td>
<td>-0.064*** (0.008)</td>
<td>-0.065*** (0.008)</td>
<td>-0.056*** (0.012)</td>
<td>-0.009 (0.008)</td>
<td>-0.019** (0.009)</td>
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<tr>
<td>ΔForecast Fed Exp/GDP×SIC Intensity</td>
<td>2.103*** (0.607)</td>
<td>2.004*** (0.678)</td>
<td>2.394*** (0.633)</td>
<td>2.989*** (0.612)</td>
<td>1.208*** (0.362)</td>
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<td>0.441 (0.423)</td>
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<td>ΔFederal Exp/GDP×SIC Intensity</td>
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<td></td>
<td>2.269 (3.639)</td>
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<td>1.507 (3.344)</td>
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<td>3.886*** (1.311)</td>
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<td>ΔVIX×SIC Intensity</td>
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<td>-0.034*** (0.004)</td>
<td>-0.011 (0.007)</td>
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<td>Yes</td>
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Notes: All columns include a full set of firm and time fixed effects (year by quarter in columns 1 to 5, and yearly in columns 6 and 7). For columns 1-5, independent variables are lagged by one quarter. Standard errors clustered at the 4-digit SIC code level.

Firm-level exposure measures are time invariant. We calculate exposure as weighted SIC-level government contract intensity, with weights given by firm’s own industry distribution of sales.
Controls include interactions of firm-level exposure with current change and forecasted future change in government purchases.

### Table 5: Cross-Firm Effects of Policy Uncertainty

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<th>Dependent Variable</th>
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<th>(5)</th>
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<td>-0.065*** (0.008)</td>
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Notes: All columns include a full set of firm and time fixed effects (year by quarter in columns 1 to 5, and yearly in columns 6 and 7). For columns 1-5, independent variables are lagged by one quarter. Standard errors clustered at the 4-digit SIC code level.

And interaction with change in VIX, plus firm and time fixed effects.